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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/423,066	11/01/1999	STEFAN SCHAFFLER	P99.2243	6308

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EXAMINER

DUONG, FRANK

ART UNIT

PAPER NUMBER

2666

DATE MAILED: 12/18/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/423,066

Applicant(s)

SCHAFFLER, STEFAN

Examiner

Frank Duong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 November 1999.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is a response to the communication dated 11/01/1999. Claims 1-19 are pending in the application.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

3. The information disclosure statement filed 11/01/1999 complies with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609. It has been considered and placed in the application file.

Drawings

4. This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

Specification

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

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As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC (See 37 CFR 1.52(e)(5) and MPEP 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text are permitted to be submitted on compact discs.) or
REFERENCE TO A "MICROFICHE APPENDIX" (See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.)
- (e) BACKGROUND OF THE INVENTION.
 - (1) Field of the Invention.
 - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (f) BRIEF SUMMARY OF THE INVENTION.
- (g) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (h) DETAILED DESCRIPTION OF THE INVENTION.
- (i) CLAIM OR CLAIMS (commencing on a separate sheet).
- (j) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (k) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

5. The disclosure is objected to because of the following informalities:

The layout for the specification should follow the above guidelines.

The abstract of the disclosure should be in a single paragraph. See MPEP § 608.01(b). Moreover, in the ABSTRACT, last line, "Fig. 1." Should be deleted.

Appropriate correction is required.

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Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. **Claims 10-19** are rejected under 35 U.S.C. 112, first paragraph, as based on a single means claim. A single means claim which covered every conceivable means for achieving the stated purpose was held nonenabling for the scope of the claim because the specification disclosed at most only those means known to the inventor. See *In re Hyatt*, 708 F.2d 712, >714-715, < 218 USPQ 195>, 197< (Fed. Cir. 1983).

As per **claim 10**, the claim calls for an arrangement comprising “a *computer unit*” configured to perform the recited functions. In this case, the single means is “a *computer unit*”.

Claims 11-19 fall with their respective parent claim 10.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. **Claims 1-9 and 18-19** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As per **claims 1-9**, the claims are narrative in form and do not contain positively recited steps of a specific process. Note that method claims should set forth a series of steps in the active tense in an instruction-like manner thereby reciting an actual method.

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Dependent claims should further limit base claims by reciting additional steps in a like-wise fashion. *Ex parte Erlich 3USPQ 2d 1011 at 1017[6]*.

As per claim 18, the claimed limitation of "*that is allocated to a radio transmission system*" is vague. It is unclear what element (arrangement, signal value, computer unit, et cetera) the claimed limitation refers to.

As per claim 19, the claimed limitation of "*that is allocated to a system for the reconstruction of archived digital data*) is vague. It is unclear what element (arrangement, signal value, computer unit, et cetera) the claimed limitation refers to.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-3, 5-15 and 17-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Barbulescu (ITERATIVE DECODING OF TURBO CODES And OTHER CONCATENATED CODES, A Dissertation, University of South Australia, pages 1-145, February 1996).

In the thesis, Barbulescu investigates iterative decoding techniques applied to concatenated coding schemes. An optimized maximum a posteriori (MAP) decoding algorithm is described and compared with a soft output Viterbi algorithm. The optimized

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MAP decoding algorithm minimizes the symbol error probability, provides soft outputs as well as has a higher dynamic range than the Viterbi algorithm.

(Applicant should note that any decoding techniques such as Barbulescu's MAP decoding algorithm; weighted output Viterbi algorithms; or soft-output Viterbi algorithms (SOVA-30 and SOVA-31) described in this thesis can clearly anticipate the broadly claimed invention of the base claims 1 and 10)

Regarding **claim 1**, in accordance with the thesis entirety, Barbulescu discloses a method for determining at least one digital signal value (0 or 1) from an electrical signal (QPSK signal) that contains signal information (*uncoded data bit d_k*) and redundancy information (*coded bit Y_k*) for the signal determined from the signal information (*note: on page 12, section 2.3 and thereafter, Barbulescu discloses the MAP algorithm wherein soft output decision algorithm provides as an output a real number which is a measure of the probability of error in decoding particular bit. This can also be interpreted as a measure of the reliability of error in decoding a particular bit. This extra information is very important for the next stage in an iterative decoding process. Thus, the recitation thereat reads on the preamble of the claim*),

whereby a dependability degree (α, β) is approximated from the electrical signal for forming the signal value (see page 13-15, sections 2.4 and 2.5),

whereby the approximation of the dependability degree (α, β) ensues such that a target function (*log likelihood ratio*) that contains a model of a transmission channel (*AWGN channel*) via which the electrical was transmitted is optimized (see pages 16-

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19, section 2.8 and the advantages of the MAP algorithm listed on pages 24-25 to include minimizes (optimization) the symbol (bit) error probability); and

whereby the digital signal value (0 or 1) is determined dependent on the respective dependability degree (see page 20, section 2.9; especially equation 2.40).

Regarding claim 2, in addition to features recited in claim 1 (see *rationales pertaining the rejection of base claim 1 discussed above*), Barbulescu further discloses whereby a plurality of digital signal values (*information bit sequence {dk}*) are determined from the electrical signal (*QPSK signal*) (see pages 12-13, section 2.3).

Regarding claim 3, in addition to features recited in claim 1 (see *rationales pertaining the rejection of base claim 1 discussed above*), Barbulescu further discloses whereby the model is a non-linear regression model (*AWGN channel with zero mean and variance*) of the transmission channel (see page 18, last paragraph).

Regarding claim 5, in addition to features recited in claim 1 (see *rationales pertaining the rejection of base claim 1 discussed above*), Barbulescu further discloses whereby the target function (*log likelihood*) is subjected to a global minimization (γ) (see pages 16-19, section 2.8).

Regarding claim 6, in addition to features recited in claim 1 (see *rationales pertaining the rejection of base claim 1 discussed above*), Barbulescu further discloses (see pages 22-23) whereby the dependability degree comprises an operational sign information (+,-) and an amount information (1) (note page 23, Barbulescu discloses for a QPSK constellation where $I=\pm 1$ and $Q=\pm 1$); and whereby the determination of the

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signal value ensues only dependent on the operational sign information (*note page 23, lines 1-2, Barbulescu discloses the energy per symbol is 2*).

Regarding **claim 7**, in addition to features recited in claim 1 (*see rationales pertaining the rejection of base claim 1 discussed above*), Barbulescu further discloses whereby the electrical signal is a systematic block code (*note page 7, last paragraph, Barbulescu discloses the described iterative decoding method is applied to the new class of turbo codes, product codes and Reed-Solomon codes (a systematic block code) concatenated with convolutional codes*).

Regarding **claim 8**, in addition to features recited in claim 1 (*see rationales pertaining the rejection of base claim 1 discussed above*), Barbulescu further discloses whereby the electrical signal is a radio signal (*note page 12, first paragraph, Barbulescu discloses the outputs of the encoder are modulated with a QPSK modulator and sent through an AWGN channel*).

Regarding **claim 9**, in addition to features recited in claim 1 (*see rationales pertaining the rejection of base claim 1 discussed above*), Barbulescu further discloses whereby the electrical signal is a restored signal of archived digital data (*inherent because on page 3, last paragraph to page 4, line 1, Barbulescu states that Shannon demonstrated that given a suitable channel encoder and decoder we can transmit digital information through the channel at a rate up to the channel capacity with arbitrarily small probability of error. Error control coding is the technique used to achieve this goal. Error control schemes add redundancy to the information sequence in such a way that the transmitted signals become more tolerant to the perturbations affecting the channel.*

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The receiver uses this extra redundancy to correct the errors introduced by the channel).

Regarding **claim 10**, the claim calls for an apparatus of the claimed method of claim 1. On page 4, in accordance with Fig. 1.4, Barbulescu show a concatenated coding system comprising INNER ENCODER, IDMC and INNER DECODER for implementing the MAP decoding algorithm discussed above in reference to the rejection of claim 1. The INNER DECODER reads on the claimed "a computer unit" for the same rationales applied in the rejection of claim 1 discussed above.

Regarding **claims 11 and 13**, in addition to features recited in base claim 10 (see *rationales pertaining the rejection of base claim 10 discussed above*) Barbulescu also discloses a receiver unit comprises an antenna (*not shown; inherent because on page 12, first paragraph, Barbulescu discloses the outputs of the encoder are modulated with a QPSK modulator and sent through an AWGN channel (a wireless channel). Thus, it is inherent there is a receiver comprises an antenna at the distant end to receive the modulated, noise additive signal over a wireless channel*). Also the claim is rejected by the same rationales applied to claim 2.

Regarding **claim 12**, in addition to features recited in base claim 10 (see *rationales pertaining the rejection of base claim 10 discussed above*) Barbulescu also discloses a demodulator unit (*not shown; inherent*) for the demodulation of the electrical signal that is connected via an input to the receiver unit and via an output to the computer unit (*note: It is inherent there is a demodulator because on page 12, first paragraph, Barbulescu discloses the outputs of the encoder are modulated with a QPSK modulator*

and sent through an AWGN channel. It is inherent there is a demodulator for reversing the modulating process at the receiving end).

Regarding **claim 14**, the claim is rejected by the same rationales applied to claims 2 and 10 discussed above.

Regarding **claim 15**, the claim is rejected by the same rationales applied to claims 3 and 10 discussed above.

Regarding **claim 17**, the claim is rejected by the same rationales applied to claims 5 and 10 discussed above.

(note in rejecting the below claims, Examiner shall equate "that is" refers to the claimed "arrangement")

Regarding **claim 18**, the claim is rejected by the same rationales applied to claims 8 and 10 discussed above.

Regarding **claim 19**, the claim is rejected by the same rationales applied to claims 9 and 10 discussed above.

Allowable Subject Matter

9. Claim 4 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter: The prior of record (Barbulescu or any listed below), considered individually or in combination, fails to fairly show or suggest the claimed target function formulated as a

non-linear regression model of the influence of the AWGN channel disturbances, in combination with other limitations recited in base claim 1, in a manner set forth as in the dependent claim 4.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Pyndiah et al (USP 5,563,897).

Viterbi et al (USP 5,442,627).

Hladik et al (USP 5,721,745).

Viterbi et al (USP 5,933,462).

Liu (USP 5,867,538).

Reed et al, Turbo-Code Termination Schemes and a Novel Alternative for Short Frames, PIMRC'96, pages 1-14, July 12, 1996.

Benedetto et al, A Soft-Input Soft-Output Maximum A Posteriori (MAP) Module to Decode Parallel and Serial Concatenated Codes, TDA Progress Report 42-127, pages 1-20, November 15, 1996.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frank Duong whose telephone number is (703) 308-5428. The examiner can normally be reached on 7:00AM-3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on (703) 308-5463. The fax phone numbers for

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the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.



DANG TON
PRIMARY EXAMINER

Frank Duong
December 13, 2002